

CLAIMS

What is claimed is:

1. A washing machine, comprising:
a cabinet having an opening at a first portion of the cabinet;
a door which opens and closes the opening of the cabinet; and
a door-locking unit which locks and unlocks the door to and from the cabinet, the door-locking unit including:
 - a handle hinged to a first hinge unit which is provided on a first position of the door,
 - a latch hinged to a second hinge unit which is provided on a second position of the door, the latch being rotated by an operation of the handle to lock and unlock the door to and from the cabinet, and
 - an elastic unit on the second hinge unit which elastically biases the latch in a direction where the latch is locked to the cabinet.
2. The washing machine according to claim 1, wherein the handle includes first and second lever parts which are integrated with each other and rotatable around the first hinge unit,
wherein the latch includes third and fourth lever parts which are integrated with each other and rotatable around the second hinge unit, the third lever part being in contact with the second lever part and the fourth lever part being positioned toward an interior of the cabinet, and
wherein when the first lever part of the handle is pulled, the elastic unit is compressed and the second lever part of the handle pushes the third lever part of the latch, allowing the fourth lever part of the latch to be unlocked from the cabinet.
3. The washing machine according to claim 2, wherein
the fourth lever part has a hook at a first end thereof, and
the cabinet has a hook hole at a first position thereof to receive the hook of the fourth lever part, allowing the hook to be removably locked to the cabinet.

4. The washing machine according to claim 2, wherein the first lever part of the handle has a longer length than the second lever part of the handle, providing mechanical advantage when the first lever part is pulled.

5. The washing machine according to claim 3, wherein the door comprises:
a transparent part which allows a user to see an interior of the cabinet; and
a frame mounted to an edge of the transparent part, the frame being open at a central portion thereof to allow the user to reach the first lever part of the handle, the first and second hinge units disposed on an inner surface of the frame spaced apart from each other by a first interval, supporting the handle and the latch in a hinging configuration.

6. The washing machine according to claim 5, further comprising a through hole at a first portion of the transparent part to correspond to the hook hole of the cabinet, allowing the fourth lever part of the latch to pass through the through hole to face the hook hole.

7. The washing machine according to claim 6, wherein the handle further comprises a first hinge shaft which is integrated with the first and second lever parts, the first hinge shaft latitudinally extending at a position between the first and second lever parts, and
wherein the first hinge unit comprises first and second seats which are spaced apart from each other by a second interval, allowing opposite sides of the first hinge shaft to be seated in the first and second seats, respectively.

8. The washing machine according to claim 7, wherein each of the first and second seats comprises:
a stopper which stops an end of the first hinge shaft so that the first hinge shaft is held in both the first and second seats; and
a plurality of support projections at respective positions of the frame inside the stopper, each of the plurality of support projections having an opening at a center thereof to rotatably support the first hinge shaft.

9. The washing machine according to claim 7, wherein the second hinge unit includes first and second support members which project from the frame spaced apart from each other by a third interval which is wider than a width of the latch, rotatably supporting a hub of the latch between the third and fourth lever parts.

10. The washing machine according to claim 9, further comprising:

a second hinge shaft around which the latch is rotatable; and

a hinge hole at a position of the hub of the latch to allow the second hinge shaft to pass through the hub of the latch, with opposite ends of the second hinge shaft being respectively supported by the first and second support members, allowing the latch to be rotatably supported on the frame.

11. The washing machine according to claim 10, further comprising first and second brackets provided on opposite sides of the through hole of the transparent part, each of the first and second brackets having a hole to allow the second hinge shaft to pass through the first and second brackets, allowing the latch to be mounted to the transparent part by passing the second hinge shaft through the holes of the first and second brackets and the hinge hole of the hub of the latch while the hub of the latch is placed between the first and second brackets.

12. The washing machine according to claim 11, wherein the elastic unit comprises:

first and second coil parts, the first coil part between the hub of the latch and the first bracket, and the second coil part between the hub of the latch and the second bracket; and

a connecting part which connects the first coil part to the second coil part, the connecting part disposed on the third lever part of the latch to be rotated by a rotation of the third lever part, the first and second coil parts being compressed or restored to original states thereof by a rotation of the connecting part, providing an elastic force to the latch.

13. The washing machine according to claim 5, wherein the door-locking unit is disposed between the transparent part and the frame and includes the handle and the latch, and

wherein the latch is rotatable by operating the handle to lock and unlock the door to the cabinet.

14. The washing machine according to claim 5, wherein the first lever part is wider and longer than the second lever part.

15. The washing machine according to claim 8, wherein the first hinge shaft is rotatably supported in the openings of the support projections while being held in the first and second seats by the stopper.

16. The washing machine according to claim 10, wherein the hub is supported by the second hinge shaft and forms a center of rotation of the latch.

17. The washing machine according to claim 10, wherein the third lever part extends from the hub horizontally to the transparent part and the frame, and wherein the fourth lever part extends from the hub to the interior of the cabinet perpendicularly to the transparent part and the frame.

18. The washing machine according to claim 2, wherein the third lever part of the latch is in contact with an inner surface of the second lever part of the handle, and wherein the third lever part of the latch is pushed by the second lever part of the handle when the first lever part of the handle is pulled.

19. The washing machine according to claim 6, wherein:
the fourth lever part is perpendicular to the third lever part,
the fourth lever part has a hook at one end, the hook being perpendicular to the fourth lever part,
the fourth lever part extends outwardly from the through hole of the transparent part facing the cabinet, and
the door is locked to the cabinet when the fourth lever part is inserted into the hook hole of the cabinet, making the hook locked by the hook hole.

20. The washing machine according to claim 12, wherein:
the first and second coil parts are disposed at opposite sides of the hub of the latch,
the connecting part of the elastic unit is in contact with the third lever part of the latch,

the hub of the latch is disposed between the first and second brackets of the transparent part, and

the second hinge shaft passes through the holes of the first and second brackets and the hinge hole of the latch.

21. The washing machine according to claim 20, wherein:

the fourth lever part extends from the through hole of the transparent part toward the cabinet perpendicularly to the transparent part, and

the third lever part of the latch extends toward a center of the transparent part parallel to the transparent part.

22. The washing machine according to claim 9, wherein:

the first and second support members are spaced apart from each other and supporting opposite ends of the second hinge shaft, and

the second hinge shaft is held in the first and second support members.

23. The washing machine according to claim 22, wherein:

the second hinge shaft is disposed between the first and second support members of the second hinge unit,

the latch is mounted to the transparent part by the second hinge shaft, and

the hub of the latch is supported by the frame and is rotatably seated between the first and second support members and the second hinge unit.

24. The washing machine according to claim 22, wherein:

the latch is disposed in the second hinge unit of the frame,

the third lever part of the latch contacts the second lever part of the handle, and

the third lever part of the latch is rotated by an operation of the handle.

25. A door-locking mechanism which locks and unlocks a door to and from a cabinet, comprising:

first and second hinge units disposed at first and second positions of the door, respectively;

a handle hinged to the first hinge unit;

a latch hinged to the second hinge unit, the latch being rotatable by an operation of the handle to lock and unlock the door to and from the cabinet; and

an elastic unit on the second hinge unit which elastically biases the latch in a direction where the latch is locked to the cabinet.

26. The door-locking mechanism according to claim 25, wherein the handle comprises:

first and second lever parts which are integrated with each other and rotatable around the first hinge unit.

27. The door-locking mechanism according to claim 26, wherein the latch comprises: third and fourth lever parts which are integrated with each other and rotatable around the second hinge unit, the third lever part being in contact with the second lever part and the fourth lever part being positioned toward an interior of the cabinet.